

## **Exhibit D to Attachment 2**

### **Scope of Work for Intrusive Investigation AK Steel Middletown Works OMS Area Landfills SWMUs 38 and 39**

**Introduction:** This scope of work outlines intrusive investigations at two closed AK Steel OMS area landfills (SWMUs 38 and 39) and the former oil ponds which underlie SWMU 39. This scope of work is not intended to present all of the tasks that may be necessary to complete an intrusive investigation of SWMUs 38 and 39. The intrusive investigation is being conducted to characterize potential source areas and potential “hot spots” within source areas. The intrusive investigation should not be confused with perimeter investigations, also conducted as part of the RFI/CMS for SWMUs 38 and 39, the purpose of which is to identify and characterize pathways of contaminant migration from such source areas. AK Steel shall detail the tasks necessary to perform this scope of work in the RFI/CMS Workplan and supporting documents for SWMUs 38 and 39 (Workplan).

**Objectives:** The overall objective of the intrusive investigation is to assist in determining if the former oil ponds and SWMUs 38 and 39 are potential sources of contamination to surrounding environmental media. Specific objectives include: 1) characterizing solid and semi-solid wastes; 2) characterizing liquids within the waste, if present (leachate; NAPLs); 3) determining the vertical extent of waste (native material/waste interface); 4) determining and characterizing the vertical extent of any gross contamination of native materials beneath the waste; and 5) collecting data to assist in evaluating the adequacy and integrity of waste containment.

**Intrusive Borings:** The intrusive work will include six borings into SWMU 39, each of which is located over a former oil pond, seven borings in the remaining areas of SWMU 39, and five borings in SWMU 38 as depicted on Figure 1. Figure 1 was generated by superimposing a USGS Topo map, photo-revised prior to landfill closure, on a 1992 aerial of the closed landfills using Ohio EPA’s ArcMap GIS system, which also provided the coordinates in Table 2 for locating each of the borings in the field. The topo lines in Figure 1 do not represent the current contours of the closed landfills and should be ignored.

Each boring will be continuously sampled until clean native materials are encountered or until the integrity of the anticipated underlying till unit is threatened. Each boring will be conducted in a manner which minimizes the potential for cross contamination of native units underlying the fill. AK Steel shall include procedures in the Workplan for insuring that the integrity of underlying till unit is not compromised. The borings will be logged and the soil cores classified according to the USCS. The surface of the landfill will be surveyed at each boring location prior to drilling to assist in anticipating the till unit during drilling. Borings encountering saturated conditions will be converted to leachate wells. Each boring not converted to a leachate well will be sealed upon completion of sampling at that boring. Borings and leachate wells may also serve as landfill gas sampling points, as needed.

**Sample Collection and Analyses:** Waste/soil samples from each boring will be field screened using methods appropriate for the parameters listed in Table 1 to assist in selecting samples to be submitted for laboratory analysis. At any given sampling location, waste materials which are similar based on field observations and field screening may be composited. Discrete grab

samples will be collected of waste materials exhibiting unique characteristics. Samples will be analyzed using the methods and parameters identified in Table 1. Samples for PCB congener analyses will be determined based on review of the Aroclor results. Potential sample media for waste samples include soil, waste, LNAPL, DNAPL, and water.

Samples of the landfill cover and of the native materials beneath the landfills will also be collected to assist in evaluation of existing waste containment. These samples will be analyzed for geotechnical parameters such as grain size distribution, Atterberg limits, and hydraulic conductivity. Samples of native materials beneath the landfills will be collected from the borings shown on Figure 1. The number and location of cover samples will be determined in the RFI/CMS Workplan.

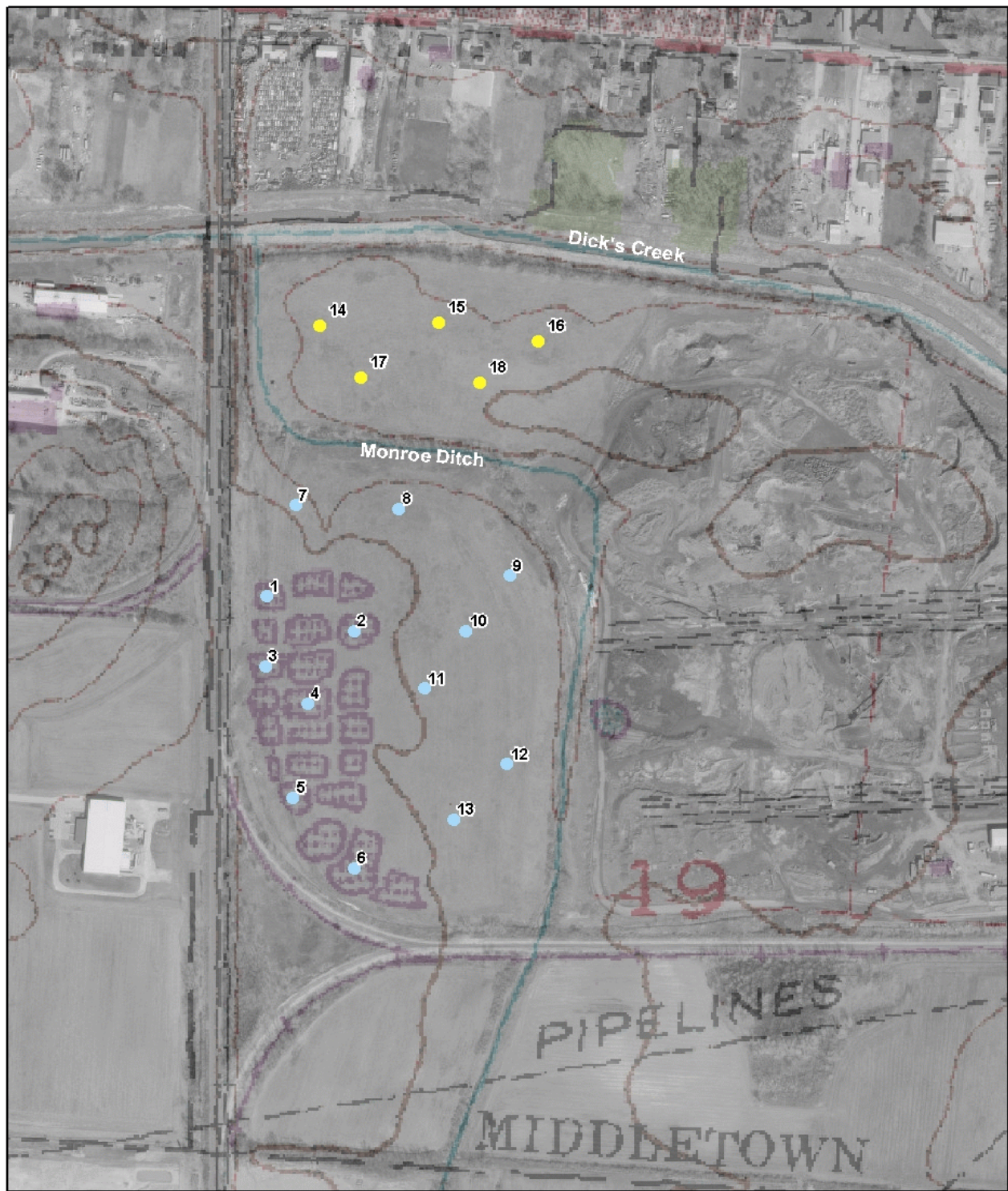
Leachate/monitoring wells will be checked for the presence of NAPLs prior to collecting liquid samples. Depth to water and any NAPL present will be measured from the surveyed top of each well casing. One aqueous and potentially two NAPL (i.e., one LNAPL and one DNAPL) samples (if present) will be collected from each installed well. Samples will be analyzed using the methods and parameters identified in Table 1. Aqueous samples will also be analyzed for pH, conductivity, turbidity, and temperature as field parameters. Samples of DNAPL will also be collected from existing monitoring well MDA-33-S and analyzed for Aroclors, PCB congeners (depending on Aroclor results) and SVOCs, assuming sufficient DNAPL is present in the well.

Sample matrices and parameters for the borings depicted in Figure 1 and for MDA-33S are summarized in Table 1. Table 1 assumes each boring could potentially encounter solids, LNAPLs, water (leachate), and DNAPLs. It is likely that not all of these sample media exist at some or all of the boring locations. Extra sample quantities will be collected for QA/QC purposes and to provide samples to be frozen in the lab for potential PCB congener analysis following review of the Aroclor results by AK Steel and Plaintiffs.

The results of the intrusive investigations outlined in this scope of work will be reviewed by AK Steel and Plaintiffs, along with any other relevant information, to determine whether additional intrusive investigation of SWMUs 38 and 39 is needed to meet the objectives of this scope of work.

Table 1								
OMS Area Landfill Intrusive Investigation Sample Parameters and Methods (SWMUs 38 and 39)								
Sample Parameters		SVOCs	VOCs	Aroclors	209 PCB congeners	Cyanide and Free Cyanide	Metals	Dioxin/furan
Analytical Methods		8072C	8260A	8082	1668A	9010B/D4282	6020/6010B 7471A	8290
Borings 1 - 18	Solid	●		●	● <sup>1</sup>	● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>
	Aqueous	●	●	●				
	LNAPL	●		●				
	DNAPL	●		●				
MDA-33S	DNAPL	●		●	●			●
Notes: <sup>1</sup> Selection of sample matrix dependent on Aroclor results <sup>2</sup> Selection of sample matrix based on field screening and potential environmental mobility								

<b>Table 2</b> <b>Boring Location Coordinates</b>			
Boring #	X	Y	SWMU
1	1434157.99582	541100.107239	39
2	1434447.6486	540979.459785	39
3	1434153.60498	540857.946902	39
4	1434294.61902	540730.08607	39
5	1434245.95056	540404.61404	39
6	1434448.32012	540160.822733	39
7	1434254.07211	541414.53237	39
8	1434596.32858	541402.470847	39
9	1434963.01291	541170.447608	39
10	1434816.68397	540979.930116	39
11	1434680.41001	540782.04046	39
12	1434953.28496	540520.833364	39
13	1434776.83554	540329.572966	39
14	1434334.46745	542032.67362	38
15	1434727.25915	542044.058887	38
16	1435057.43189	541981.43992	38
17	1434471.09065	541856.201986	38
18	1434863.88235	541839.124086	38
Coordinate System: NAD 1983 State Plane Ohio South (Feet)			



**Figure 1**  
**OMS Area Landfills**  
**Intrusive Investigation**  
**SWMUs 38 & 39**



- SWMU 38 Borings
- SWMU 39 Borings

0 250 500 Feet

Butler County Orthophoto (aerial) 1992  
 Trenton, Ohio Quadrangle, USGS 1966 (photorevised 1981)